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10/568,450

03/16/2006

Isamu Yoshi

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EXAMINER

YU, LIHONG

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

10/14/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/568,450

Applicant(s)

YOSHI, ISAMU

Examiner

LIHONG YU

Art Unit

2611

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period **will** apply and **will** expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply **will**, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments received on June 22, 2009 have been fully considered but they are not persuasive.

(1) **Applicant's Arguments:** "Claim 1 defines a multi-carrier communication apparatus that, *inter alia*, controls a combined transmission power of groups of sub-carriers each comprising a predetermined number of sub-carriers. The Applicant submits that Li does not disclose this subject matter, and the Office Action provides no express findings of fact to the contrary".

**Examiner's Response:** Li teaches an OFDMA communication system which has different sub-carriers for a subscriber (**Li at col. 1, lines 58-67**).

Li teaches partitioning the sub-carriers into clusters of sub-carriers that are used for data transmission with the subscribers (**Li at col. 2, lines 10-22**).

Li then teaches selecting clusters of sub-carriers that have relative large powers for use in transmitting data signals (**Li at col. 10, lines 4-28**).

(2) **Applicant's Arguments:** "Claim 8 defines a multi-carrier communication apparatus that, *inter alia*, calculates a difference in power between a measured combined received power and a desired target received power.

The Office Action proposes that Li discloses calculating a power difference, for a cluster of sub-carriers, between a pilot period and a data period and using the power difference to select a desired cluster of sub-carriers (see Office Action page 6, second paragraph).

However, it is submitted that calculating a power difference for a sub-carrier cluster at different times for use in selecting a desired cluster is not identical to the Applicant's claimed subject matter of calculating a difference in power between a measured combined received power and a desired target received power".

**Examiner's Response:** Li teaches that  $P_D$  is the measured power corresponding to a cluster of sub-carriers during data period, and  $P_P$  is the measured power corresponding to a cluster of sub-carriers during pilot period. The power for each cluster of sub-carriers is a combined power of sub-carriers in that cluster (see Li at col. 10, lines 20-24).

Li teaches selects clusters of sub-carriers that have large  $P_P / (P_P - P_D)$  (see Li at col. 10, lines 25-28). When  $P_D$  is very close in value with that of  $P_P$ , the expression  $P_P / (P_P - P_D)$  achieve a very large value.

The examiner admits that  $P_P$  is determined at a different time than that of  $P_D$ . This exactly reads on the applicant's limitation of 'a measured combined received power and a desired target received power' since these two powers are evidently determined at different times.

**(3) Applicant's Arguments:** "Thus, Li discloses ordering and selecting clusters on a per sub-carrier group basis, based on the power difference between pilot periods and data periods. However, Li fails to disclose the Applicant's claimed subject matter of controlling transmission power on a sub-carrier group basis".

**Examiner's Response:** As discussed above, Li teaches selecting cluster of sub-carriers for data transmission based on the power of that cluster. The 'selecting' operation is obviously a 'control' operation.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 5 and 7-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al (US 6,904,283 B2).

#### **Consider claim 1:**

Li discloses a multi-carrier communication apparatus (*see Li at the abstract, where Li describes an invention for partitioning sub-carriers in an OFDMA system*) comprising:

- a superimposing section superimposing corresponding transmission symbols with groups of sub-carriers constituting a plurality of sub-carriers combined together in predetermined numbers (*see Li at col. 5, lines 35-45, where Li describes that a base station periodically broadcasts pilot OFDM symbols to every subscriber; see col. 7, lines 36-49, where Li describes the pilot symbols cover the entire OFDM frequency bandwidth which is supported by a number of clusters; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable*) ;
- a control section controlling combined transmission power of the groups of sub-carriers the transmission symbols are superimposed upon (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for each cluster; a power difference ordering processing block 405 performs cluster selection based on the SINR*); and
- a transmission section transmitting multi-carriers signals obtained by controlling the combined transmission power (*see Li at col. 9, lines 65-67 and col. 10, lines 1-3, where Li describes that once the clusters have been selected, the subscriber sends a request to the base station; see Li at Fig. 1B, and col. 6, lines 7-46, where Li describes that the feedback information from the subscriber to the base station is used by the base station to select one or more clusters for the subscriber and to establish a data link between the base station and the subscriber*).

**Consider claim 2:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the superimposing section comprises an acquisition section for acquiring only the number of sub-carriers where the same transmission symbol is contained in the sub-carrier group, and superimposes the acquired same symbols with each sub-carrier of a group of sub-carriers (*see Li at col. 6, lines 18-29, where Li describes the base station receives the feedback from the subscriber about the selected sub-carrier clusters to be used for symbol transmission, the base station then allocates sub-carriers according to the feedback; see col. 5, lines 40-42, where Li describes each symbol covers the entire OFDM frequency bandwidth*).

**Consider claim 3:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the acquisition section comprises:

- a repetition section duplicating just transmission bits for a number of sub-carriers contained in the groups of sub-carriers (*see Li at col. 7, lines 14-32, where Li describes one QPSK symbol can be repeated over four sub-carriers of two OFDM symbols*); and
- a modulation section modulating duplicated transmission bits using an M-ary number corresponding to the number of sub-carriers so as to acquire the same symbol as for the number of sub-carriers (*see Li at col. 7, lines 14-32, where Li describes quadrature phase shift keying (QPSK) modulation*).

**Consider claim 5:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the control section controls combined transmission power in accordance with a command transmitted from a remote communication station indicating a difference in power between combined received power for the sub-carrier group at the remote communication station and desired target received power (*see Li at Fig. 1B, Fig. 4, and col. 6, lines 18-29, where Li describes the base station allocates clusters according to a feedback from subscriber, the feedback is based on power calculation for each cluster of sub-carriers; see col. 9, lines 63-67 and col. 10, lines 1-3, where Li describes the power difference between pilot periods and data periods are used to select desired cluster of sub-carriers*).

**Consider claim 7:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the control section controls the combined transmission power in accordance with combined received power information for the sub-carrier groups notified by the remote communication station (*see Li at Fig. 1B, Fig. 4, and col. 6, lines 18-29, col. 9, lines 55-67 and col. 10, lines 1-3, where Li describes the base station allocates clusters according to a feedback from the subscriber, the feedback is based on power calculation and ordering for each cluster of sub-carriers*).

**Consider claim 8:**

Li discloses a multi-carrier communication apparatus (*see Li at the abstract, where Li describes an invention for partitioning sub-carriers in an OFDMA system*) comprising:



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- a receiving section receiving a multi-carrier signal containing a plurality of sub-carriers (*see Li at col. 2, lines 10-22, where Li describes a subscriber to the OFDMA system*);
- a measuring section measuring combined received power each group of sub-carriers formed by combining predetermined numbers of sub-carriers contained in the multi-carrier signal (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for each cluster; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable*);
- a calculating section calculating a difference in power between the measured combined received power and desired target received power (*see Li at Fig. 1B, Fig. 4, and col. 6, lines 18-29, where Li describes the base station allocates clusters according to a feedback from subscriber, the feedback is based on power calculation for each cluster of sub-carriers; see col. 9, lines 63-67 and col. 10, lines 1-3, where Li describes the power difference between pilot periods and data periods are used to select desired cluster of sub-carriers*); and
- a notifying section notifying a remote communication station of the calculated difference in power (*see Li at col. 6, lines 7-17, where Li describes the feedback from the subscriber to the base station*).

**Consider claim 9:**

Li discloses the multi-carrier communication apparatus according to claim 8 above. Li discloses a combining section combining symbols superimposed on each sub-carrier of the groups of sub-carriers; and a demodulating section demodulating symbols acquired by combination (*see Fig. 3 and col. 8, lines 37-47, where Li describes the subscriber receives pilot and data symbols*).

**Consider claim 10:**

Li discloses a transmission power control method (*see Li at col. 9, lines 47-54, where Li describes selecting sub-carrier cluster based on power difference*) comprising:

- a superimposing step of superimposing corresponding transmission symbols with groups of sub-carriers that are a plurality of sub-carriers combined together in predetermined numbers (*see Li at col. 5, lines 35-45, where Li describes that a base station periodically broadcasts pilot OFDM symbols to every subscriber; see col. 7, lines 36-49, where Li describes the pilot symbols cover the entire OFDM frequency bandwidth which is supported by a number of clusters; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable*);
- a control step of controlling combined transmission power of the groups of sub-carriers the transmission symbols are superimposed upon (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs*

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*power calculations for each cluster; a power difference ordering processing block 405 performs cluster selection based on the SINR); and*

- *a transmission step of transmitting multi-carriers signals obtained by controlling the combined transmission power (see Li at col. 9, lines 65-67 and col. 10, lines 1-3, where Li describes that once the clusters have been selected, the subscriber sends a request to the base station; see Li at Fig. 1B, and col. 6, lines 7-46, where Li describes that the feedback information from the subscriber to the base station is used by the base station to select one or more clusters for the subscriber and to establish a data link between the base station and the subscriber).*

**Consider claim 11:**

Li discloses a multi-carrier communication system controlling transmission power of transmission apparatus using received power occurring at receiving apparatus (*see Li at the abstract, where Li describes an invention for partitioning sub-carriers in an OFDMA system; see Li at col. 9, lines 47-54, where Li describes selecting sub-carrier cluster based on power difference calculated at a subscriber*), the receiving apparatus:

- *receiving a multi-carrier signal containing a plurality of sub-carriers (see Li at col. 2, lines 10-22, where Li describes a subscriber to the OFDMA system );*
- *measuring combined received power each group of sub-carriers formed by combining predetermined numbers of sub-carriers contained in the multi-carrier signal (see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401*

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*performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for each cluster; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable);*

- calculating a difference in power between the measured combined received power and desired target received power (*see Li at Fig. 1B, Fig. 4, and col. 6, lines 18-29, where Li describes the base station allocates clusters according to a feedback from subscriber, the feedback is based on power calculation for each cluster of sub-carriers; see col. 9, lines 63-67 and col. 10, lines 1-3, where Li describes the power difference between pilot periods and data periods are used to select desired cluster of sub-carriers); and*
- notifying the transmission apparatus of the calculated difference in power (*see Li at col. 6, lines 7-17, where Li describes the feedback from the subscriber to the base station), and the transmission apparatus:*
- superimposing mutually corresponding transmission symbols with each sub-carrier of the sub-carrier groups (*see Li at col. 5, lines 35-45, where Li describes that a base station periodically broadcasts pilot OFDM symbols to every subscriber; see col. 7, lines 36-49, where Li describes the pilot symbols cover the entire OFDM frequency bandwidth which is supported by a number of clusters; see col. 5, lines 18-27, where Li describes that a cluster contains at least one sub-carrier, the mapping between a cluster and its sub-carriers can be fixed or re-configurable);*

- controlling combined transmission power of the group of sub-carriers the transmission symbols are superimposed with according to a difference in power notified of by the receiving apparatus (*see Li at Fig. 4, and col. 9, lines 55-67 and col. 10, lines 1-2, where Li describes a unit 401 performs SINR estimation for each cluster; a power calculation processing block 402 performs power calculations for each cluster; a power difference ordering processing block 405 performs cluster selection based on the SINR*); and
- transmitting a multi-carrier signal obtained by controlling the combined transmission power (*see Li at col. 9, lines 65-67 and col. 10, lines 1-3, where Li describes that once the clusters have been selected, the subscriber sends a request to the base station; see Li at Fig. 1B, and col. 6, lines 7-46, where Li describes that the feedback information from the subscriber to the base station is used by the base station to select one or more clusters for the subscriber and to establish a data link between the base station and the subscriber*).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US 6,904,283 B2) in view of Todd (5,357,284).

**Consider claim 4:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses a separating section separating transmission symbols into in-phase components and orthogonal components (*see Li at col. 7, lines 14-32, where Li describes quadrature phase shift keying (QPSK) modulation and 16QAM symbol position*). Li discloses transmission symbol are superimposed with each sub-carrier of the sub-carrier group (*see Li at Fig. 2 and col. 7, lines 37-49, where Li describes each symbol occupies the entire OFDM frequency bandwidth which is supported by sub-carrier clusters*).

However, Li does not disclose a combining section for substituting and combining one of the in-phase component and orthogonal component obtained through separation with a symbol to be paired with the transmission symbol.

Todd teaches a combining section for substituting and combining one of the in-phase component and orthogonal component obtained through separation with a symbol to be paired with the transmission symbol (*see Todd at Fig. 8, item 822 and col. 15, lines 15-36*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Li, and to have a combining section for substituting and combining one of the in-phase component and orthogonal component obtained through separation with a symbol to be paired with the transmission symbol, as taught by Todd, thus allowing for easy signal transmission, as discussed by Todd (*see Todd at col. 2, lines 25-35*).

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US 6,904,283 B2) in view of Sakamoto (US 6,816,453 B1).

**Consider claim 6:**

Li discloses the multi-carrier communication apparatus according to claim 1 above. Li discloses the control section performs operations in such a manner that power corresponding to the difference in power is distributed evenly across each sub-carrier of a sub-carrier group (*see Li at col. 16, lines 1-8, where Li describes diversifies the clusters of sub-carriers in situations where the power difference between pilot symbols for each cluster is large; see col. 15, lines 6-15, where Li describes a diversity cluster has less of variation in channel gain*).

Li does not disclose the operations above are increasing and decreasing transmission power of each sub-carrier.

Sakamoto teaches increasing and decreasing transmission power of each sub-carrier (*see Fig. 2, item 1200, and col. 10, lines 29-39*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Li, and to increase and decrease transmission power of each sub-carrier, as taught by Sakamoto, thus allowing for easier signal determination, as discussed by Sakamoto (*see Sakamoto at col. 2, lines 13-24*).

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIHONG YU whose telephone number is (571) 270-5147. The examiner can normally be reached on 8:30 am-7:00 pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lihong Yu/

Examiner, Art Unit 2611

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611